

MEMORANDUM OF AGREEMENT

between

DEPARTMENT OF THE AIR FORCE,

AIR FORCE GEOPHYSICS LABORATORY (AFGL)

and

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION /

GODDARD SPACE FLIGHT CENTER (NASA/GSFC)

for

ACQUISITION OF SSM SENSORS FOR

DEFENSE METEOROLOGICAL SATELLITE PROGRAM (DMSP)

October 1985

1. PURPOSE

This Memorandum of Agreement establishes the management criteria and areas of responsibility between the Air Force Geophysics Laboratory (AFGL) of the Department of the Air Force and the Goddard Space Flight Center (GSFC) of the National Aeronautics and Space Administration relative to the acquisition of the Special Sensor Magnetometer (SSM) vector magnetic field sensors to be flown on spacecraft of the Defense Meteorological Satellite Program (DMSP).

2. GENERAL

DMSP is an ongoing program of the Department of Defense. DMSP spacecraft are placed in orbit to acquire required data for supporting the meteorological and space weather operational needs of the Air Force. In addition the meteorological and space data are saved and are available for scientific analysis. Space environmental sensors

include the SSIES which measures thermal plasma drifts, density and irregularities, the SSJ/4 which measures precipitating ions and electrons in the energy range of 40 eV to 30 keV, the SSM which measures magnetic fields and field-aligned currents and the OLS which makes images of the aurora in the dark polar regions. The present series of satellites are referenced by either a flight number (F7) or a spacecraft number (S7). The DMSP office (SD/YD) of Space Division (AFSC) has responsibility for the overall DMSP system. In turn, the DMSP office has delegated responsibility for acquisition of the SSM sensor to AFGL.

The SSM is an operational (or mission), environmental sensor which measures the vector magnetic field at the location of the sensor. The data from the SSM will be used to detect and define deviations of the geomagnetic field due to electrical currents flowing along geomagnetic field lines in order to determine the energy input to the ionosphere and atmosphere. In addition data from the SSM will be used to define the instantaneous geomagnetic field vector for the on-board attitude system. A proof of concept SSM was flown on DMSP F7.

The primary sensor on the DMSP spacecraft is the Operational Linescan System (OLS) which images the clouds in the visible and near-infra-red bands. The OLS system acts as the interface between the SSM and the telemetry for all digital data. The SSM interfaces with the spacecraft for power and analog data.

3. GENERAL AGREEMENTS

AFGL and NASA/GSFC agree that the NASA standard quality assurance provisions applicable to flight instruments are waived and superceded by the quality assurance provisions of the DMSP office at Space Division.

4. FUNCTIONAL RESPONSIBILITIES

a. AFGL will:

- (1) Provide program direction, technical consultation and management assistance to NASA/GSFC.
- (2) Provide the quality assurance provisions with references to the appropriate MIL-STD and MIL-SPEC.
- (3) Coordinate the sensor integration onto the spacecraft through SD/YD and its contractors.
- (4) Provide funds to NASA/GSFC to acquire four (4) SSM sensors and associated ground support equipment, to test and calibrate all SSM sensors, to maintain all SSM sensors, and to support the integration after delivery in accordance with letter from NASA/GSFC to AFGL.
- (5) Provide spacecraft and OLS specification and interfaces as required.
- (6) Approve all design changes and improvements to the system.
- (7) Provide copies to GSFC of the data from the F7/SSM and other sensors as required to facilitate joint analysis of these data.
- (8) Provide copies to GSFC of the data from the SSM on S42 through S45 after the launch of these instruments.

b. NASA/GSFC will:

(1) Plan, direct, control and accomplish the design, fabrication, pre-integration testing and calibration of the SSM sensors in accordance with the Specification written by AFGL dated 23 Oct 85 and the technical and financial plan submitted by NASA/GSFC dated 17 Oct 85. Appropriate MIL-STD and MIL-SPEC will be used in the design, fabrication, testing and calibration of the SSM sensors. NASA standards, procedures, etc. which exceed or are equivalent to the appropriate MIL-STD and MIL-SPEC may be substituted as necessary.

(2) Submit quarterly reports to AFGL/PHG on the technical status.

(3) Submit monthly reports to AFGL/PHG on the financial status. For funds expended within NASA/GSFC, expenses will be reported by category as incurred. For sub-contracts, a financial plan will be submitted at the beginning of the contract and total expenses will be reported as incurred.

(4) Prepare agenda for, conduct and prepare minutes of a Preliminary Design Review (PDR) Meeting, a Critical Design Review (CDR) Meeting and three Acceptance Audit (AA) Meetings.

(5) Provide a "C1a" Product Function Specification in accordance with MIL-STD-490.

(6) Provide drawings of all designs and layouts of electronic and mechanical systems in accordance with military standards MIL-STD-480A and MIL-STD-483 and specification DOD-D-7000B.

(7) Provide necessary information for the sensor/spacecraft and sensor/OLS Interface Control Documents.

(8) Perform the environmental testing and calibration of each flight instrument to the levels given in the Specifications dated 23 Oct 85.

(9) Deliver the SSM mission sensor units according to the following schedule:

S-12	1 OCT 86
S-13	1 JUL 87
S-14	1 APR 88
S-15	2 Jan 89

(10) Support spacecraft and OLS level testing to insure proper integration and post-delivery functioning of the SSM. Five, two-man trips to SD contractor facilities and one, one-man trip to the launch site per instrument are anticipated. Make repairs and re-qualify the sensor as needed.

(11) Support engineering and program working group meetings as required. Four, two-man trips per year for the duration of the MOA are anticipated.

(12) Analyze and interpret data from the F7/SSM to determine capabilities and limitations of the DMSP spacecraft as a platform for magnetic field measurements. Incorporate the results of the analysis into the design and/or make suggestions for future designs.

5. FUNDING

a. Funding will be provided to NASA/GSFC by AFGL for the design, fabrication, testing, calibration, integration support and other support to be provided hereunder for four (4) SSM sensors for DMSP S-12, S-13, S-14 and S-15. These funds will be sufficient to cover all costs in accordance with technical and financial plans and their updates submitted by NASA/GSFC and the requirements stated by AFGL.

b. Funds will be allocated for manpower, travel, contracts and other costs in accordance with the financial plan. All funds from the initial allotment will be obligated before 30 Sept 87 and will be expended before 30 Sept 90. For FY88 and following years, AFGL will provide funds only for federal manpower and travel as required. The total cost for all items, except for federal manpower and travel in FY88 and beyond, is currently estimated to be \$800,000. The cost for federal manpower and travel in FY88 and FY89 is estimated to be \$20,000 and \$40,000 respectively.

6. Terms and Provisions

a. This agreement will be effective from the date of final approval signature and will be reviewed annually to insure currency and accuracy.

b. Costs increases which cause the cost to exceed the estimate above will be identified to AFGL and jointly agreed upon prior to expenditure.


c. The agreement will remain in effect for the period specified above, unless superseded or terminated earlier. It may be extended or terminated at any time in writing by mutual consent, or terminated by written notice from either party to the other party at least 420 days in advance.

d. This agreement may be changed by formal amendment negotiated and approved by both parties.

e. If any term or provision of this agreement comes in conflict with the regulations or instructions of the higher headquarters of either party, the appropriate party will initiate action to propose appropriate changes.

FOR AIR FORCE GEOPHYSICS LABORATORY

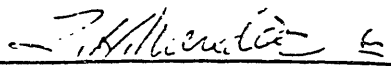
FOR GODDARD SPACE FLIGHT CENTER



J. R. JOHNSON, Colonel, USAF
Commander
AFGL

NOV 12 1985

DATE _____



NOEL HINNERS
Director
GSFC

DATE _____

12/26/85